Analyzing Trends of UFO Sightings

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Abstract

Unidentified flying objects (UFO) have baffled people for more than a century. This study examined whether or not there was a relation between population density, military installations, and UFO sightings, as well as, the most common shapes of UFOs. United States UFO data, collected from 1933-Present, was brought in, projected, and analyzed using various ArcGIS tools including: select by attribute, select by location, buffer, density calculator, etc. Results show that population density does not necessarily equate with an increase in UFO sightings. The states with the highest UFO sightings per capita include: Montana, Washington, Oregon, New Mexico, Arizona, Maine, and Idaho. However, there is a strong correlation between UFO sightings and military bases, with 85% of the sightings being within 80,000 meters from a military installation. The most common shape of UFO, after the other category, was the light/fireball. In the future, other factors could be analyzed to build the case that UFO's are simply military related rather than extraterrestrial.

Introduction

For years, people have looked up into the night sky and witnessed mysterious sights in the night sky, aptly named, unidentified flying objects. Though UFO's are sighted all across the world, the focus of this study will be on the continental United States (Figure 1, pg 2). Data of reported sightings, dating back from 1933 to the present, will be analyzed to determine patterns or trends surrounding the UFO's across the country. Factors to compare in determining correlation included: population density, time of day, proximity to military bases, types of sightings, amount of sightings, and UFO shape. Studies will aid in determining possible correlations between population, military bases, and UFO sightings.



Figure 1: Continental United States, North America.

Methods

Data was collected from a variety of locations (Table 1, pg 3), and metadata was analyzed, where applicable, to determine suitability of files. Once the data was brought it, batch project was used to set the layers to NAD 1983, Albers Equal Area Conic. ArcGIS tools/functions used included: batch project, select by attribute, select by location, buffer, density calculator, polygon to point, field calculator.

Given the higher probability of unusual sightings near military bases, the "select by location" tool was used to find UFO sightings within 16,000 Meters, 32,000 Meters, and 80,000 Meters of military installations. The number of sightings for each distance was divided by total

UFO sightings to find the percentage of total sightings. Using data acquired from the Department of Defense, an additional attribute column was added to display the area in each state owned by military operations. This data was divided by the total area to find the percentage. States were ranked by the amounts of military presence. Percentages of total sightings by state were compared to this state military presence ranking.

Dataset Name	Description	Spatial Reference	Data Sourco	Link to Data
Dataset Name	Description	spatial Reference	Data Source	LINK LO DALA
		System/Projection		Source
USCensus.shp	US Census	NAD 83, Albers Equal	United States	US Census
	Data	Area Conic	Census Bureau	<u>Website</u>
UFOSightings.shp	UFO Sighting	NAD 83, Albers Equal	NUFORC	NUFORC
	Data: Time,	Area Conic		Website
	Place, Shape,			
	etc.			
MilitaryBase.shp	US Military	NAD 83, Albers Equal	Bureau of	Koordinates
	Installations	Area Conic	Transportation	Website
World.shp	World Land	NAD 83, Albers Equal	Natural Earth	Natural
	Layer	Area Conic	Data	Earth Data
Lake.shp	Major Lakes	NAD 83, Albers Equal	Natural Earth	<u>Natural</u>
	and	Area Conic	Data	Earth Data
	Reservoirs			
USStates.shp	United States	NAD 83, Albers Equal	Natural Earth	<u>Natural</u>
	Lower 48	Area Conic	Data	Earth Data

Table 1. Collected datasets for UFO analysis. Other layers utilized the ArcGIS base map site.

Sighting per capita by state was obtained using the field calculator to divide number of sightings by total population. This number was multiplied by 100,000 to find the sightings per 100,000. Population density was obtained by dividing the population by the area of each state. Finally, UFO sightings were analyzed to determine the variety and frequency of UFO shapes.

Results

Three maps (Figure 2, 3, & 4) display trends in UFO sightings relative to population density, state sightings per capita, and sightings in relations to Military Bases, respectively. Table 2 offers approximate sightings per 100,000 people. The six highest UFO sighting rates are highlighted in yellow. These states include Montana, Washington, Oregon, New Mexico, Arizona, and Idaho. They are ranked 38th, 7th, 29th, 4th, 3rd, and 28th in military presence, respectively. Table 3 displays percent sightings in relation to the distance from military installations. Figure 4 shows commonly reported shapes of UFO sightings.



Figure 2: UFO sighting occurrences and state population density.

State	Sightings	State	Sightings	State	Sightings	State	Sightings
	Per 100,000		Per 100,00		Per 100,00		Per 100,00
AL	10.44	IL	15.81	<mark>MT</mark>	<mark>38.00</mark>	PA	14.61
AR	17.76	IN	16.33	NC	14.47	RI	18.24
AZ	<mark>26.86</mark>	KS	15.32	ND	14.27	SC	18.79
CA	18.87	KY	17.03	NE	17.85	SD	17.07
CO	22.29	LA	10.10	NH	29.78	TN	15.25
CT	18.16	MA	14.01	NJ	11.82	TX	11.28
DC	0.17	MD	11.47	<mark>NM</mark>	<mark>27.49</mark>	UT	18.02
DE	14.92	ME	33.73	NV	23.40	VA	11.64
FL	15.80	MI	15.70	NY	10.94	VT	31.96
GA	10.33	MN	15.67	OH	15.45	WA	<mark>45.67</mark>
IA	17.27	MO	20.35	OK	13.36	WI	16.95
ID	25.71	MS	9.94	OR	<mark>36.44</mark>	WV	19.81
						WY	25.55

Table 2: UFO sightings per 100,000 people, by state.



Figure 3: UFO Sightings per 100,000 people by state



Figure 4: UFO Sightings and their relative proximity to Military Bases.

Table 3.	Percentage	of UFO	sightings	and proxin	nitv to i	militarv	installations.
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Percent of Sightings	Distance from Military Bases
34 Percent	16,000 Meters
55 Percent	32,000 Meters
85 Percent	80,000 Meters





Conclusion

Upon review of the results, there appears to be a strong correlation between population, UFO sightings, and military installations. The studies answered a number of questions posed before the beginning of the study:

- Q. What states have disproportionate amount of sightings?
- A. Washington, Maine, New Mexico etc. have reported more sightings per 100,000 people compared to more populated states such as New York, California, etc.
- Q. Is there correlation between number of sightings and presence of military bases?
- A. Yes, there is a strong correlation. 84% of sightings are within 50 miles of a military base and 54% within 20 miles.
- *Q.* What UFO shapes are most frequently reported in the US?
- A. The most common attribute for the shape of the UFO is a changing object followed by a light/fireball formation. However, 40% of sightings are something other than the four most prevalent shapes.

In the future, other categories and locations across the world could be examined to see if this correlation proves the same.

Bibliography

Minca, C., 2007, Humboldt's Compromise, or the Forgotten Geographies of Landscape, Progress in Human Geography, Volume 31, Issue 2, Pages 179-1